

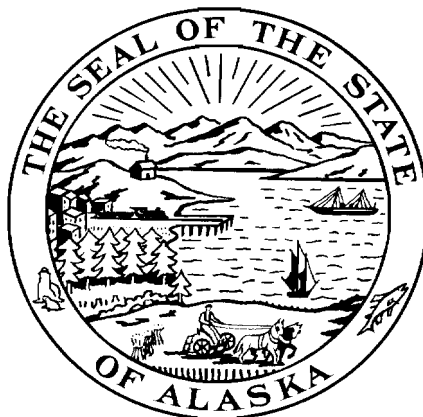
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STATE OF ALASKA

William A. Egan, Governor



ANNUAL REPORT OF PROGRESS, 1965 - 1966

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-7

SPORT FISH INVESTIGATIONS OF ALASKA

ALASKA DEPARTMENT OF FISH AND GAME  
Walter Kirkness, Commissioner

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Sport Fish Division

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## INTRODUCTION

This report of progress consists of Job Segment Reports conducted under the State of Alaska Federal Aid in Fish Restoration Project F-5-R-7, "Sport Fish Investigations of Alaska."

The project during this report period is composed of 18 separate studies. Some are specific to certain areas, species or fisheries, while others deal with a common need for information. Each job has been developed to meet the needs of various aspects of the State's recreational fishery resource. Seven jobs are designed to pursue the cataloging and inventory of the numerous State waters. These jobs, which are of a continuing nature, will eventually index the potential recreational fisheries. Four jobs are directed toward specific sport fish studies. These include specialized efforts toward the anadromous Dolly Varden of Southeastern Alaska, the silver salmon in Resurrection Bay, the king salmon stocks on the Lower Kenai Peninsula, the king salmon stocks in Upper Cook Inlet, and the Arctic grayling of the Tanana River system.

The statewide access program is developing rapidly. Our efforts in investigating existing and potential recreational sites and access has resulted in favorable action being taken on our proposals and recommendations submitted to the land management agencies at both the State and Federal levels.

The remaining jobs included a specialized creel census effort in Southeastern, an egg-take program designed to establish indigenous egg-take sources, and evaluation of the Fire Lake system.

Three special reports have been completed from past studies on the Dolly Varden study. These appear in the Department's "Research Report" series and are a direct result of the Federal Aid In Fish Restoration Program. To date, the following reports have been published: Research Report No. 3, "Some Migratory Habits of the Anadromous Dolly Varden Salvelinus malma (Walbaum) in Southeastern Alaska," 1965, Robert H. Armstrong; Research Report No. 4, "Annotated Bibliography on the Dolly Varden Char," 1965, Robert H. Armstrong; and Research Report No. 5, "Age and Growth of Anadromous Dolly Varden Char Salvelinus malma (Walbaum), in Eva Creek, Baranof Island, Southeastern Alaska," 1966, David W. Heiser.

The material contained in this progress report is often fragmentary in nature. The findings may not be conclusive and the interpretations contained herein are subject to re-evaluation as the work progresses.

## RESEARCH PROJECT SEGMENT

STATE: ALASKAProject No.: F-5-R-7Name: Sport Fish Investigations  
of Alaska.Job No.: 7-ATitle: Inventory and Cataloging of  
the Sport Fish and Sport Fish  
Waters on the Kenai Peninsula,  
Cook Inlet-Prince William Sound  
Areas.Period Covered: July 1, 1965 to June 30, 1966.

## ABSTRACT

A creel census to determine the sport harvest of red salmon, Oncorhynchus nerka, from the Russian River was continued for the fourth year. An estimated 10,700 red salmon were caught during 8,318 man-days of effort. The catch constituted 22.4 percent of the total red salmon run in the stream. The seasonal rate of success was 0.25 fish per hour. Information is also presented on the rate of success by angling method.

In total, 988 Arctic grayling, Thymallus arcticus, from Crescent Lake were introduced into five Kenai Peninsula waters in an attempt to establish self-sustaining populations. Transplanted fish had a mean fork length of 227.0 mm and were predominately age II+.

Cataloging and inventory activities were conducted on 52 lakes in the Kenai National Moose Range. Forty-one of these lakes contained game fish with rainbow trout, Salmo gairdneri, and Arctic char, Salvelinus alpinus, the most common species. Major population features are described for rainbow trout and Arctic char in the Swanson River drainage.

## RECOMMENDATIONS

Retain present objectives of the study with emphasis directed toward the following:

1. Evaluate past Arctic grayling introductions and investigate additional waters for the establishment of this species. Grayling transplants should again be made in Twin Lakes and Upper Granite Creek.
2. Initiate a creel census on the saltwater sport fishery in Kachemak Bay.

3. Evaluate roadside lakes which have no game fish populations for possible rehabilitation and stocking.
4. Continue the Russian River creel census to determine the effect of a flies-only regulation on red salmon.
5. Initiate a rainbow trout and Arctic char age and growth study.

#### OBJECTIVES

1. To assess the environmental characteristics of the existing and potential fishery waters of the job area and, where practicable, obtain estimates of existing or potential angler use and sport fish harvest.
2. To evaluate application of fishery restoration measures and availability of sport fish egg sources.
3. To assist as required in the investigation of public access status to the area's fishing waters.
4. To evaluate multiple water use development projects (public and private) and their effects on the area's streams and lakes for the proper protection of the sport fish resources.

#### TECHNIQUES USED

The Russian River creel census was a modification of the method described by Neuhold and Lu (1957). Changes in the sampling design have been outlined by Engel (1964).

Transplanted grayling were captured with a 50-foot beach seine at the outlet of Crescent Lake. Fish were transported by helicopter, fixed-wing aircraft, and pickup truck in 10- and 22-gallon plastic containers. Water temperatures during transit were kept between 52° and 59°F. Shipments were made at densities as high as 55 fish per 22-gallon container. Grayling destined for Upper Granite Creek were flown to Summit Lake and then were taken to the stream by truck. This lot received bottled oxygen during most of the 2-hour trip.

Standard lake survey methods were used to collect physical and chemical data. Variable mesh, 125-foot gill nets (3/4- to 2-inch bar measure) were employed to determine the fish species present, relative abundance, and to obtain age and growth information. Cellulose-acetate scale impressions were examined by microprojector for age determinations. Ages are designated by Roman numerals corresponding to the number of annuli.

Detailed volumetric surveys were accomplished with aerial photographs, sounding line and a recording fathometer. A portable P-100 Ross depth finder was utilized for general cataloging activities.

## FINDINGS

### Russian River Creel Census

Cook Inlet red salmon, long recognized as a valuable commercial species, have become increasingly important to the area's sport fishermen in recent years. This importance is exemplified at the Russian River where the red salmon sport fishery has developed into the second largest on the Kenai Peninsula. Most of the red salmon catch from this stream are "snagged" because the traditional belief is that the species will not readily strike a lure or bait. Because criticism of this angling method has intensified with the growth of the fishery, management requires both biological and ethical consideration. Past management practices for the Russian River have been discussed by Lawler (1963).

In December, 1964, the Board of Fish and Game prohibited the use of treble hooks on the Russian River in an effort to reduce snagging. New regulations (two single hooks with gap between point and shank 1/2-inch or smaller) were in effect throughout most of the red salmon run. The possession limit of 3 red salmon over 16 inches remained unchanged.

To evaluate the effects of these regulations, the creel census initiated in 1962 was continued during this report segment. The census was active from June 16 to August 15 and sampled nearly all the upstream migration. Sixty-two fishermen counts during this period enumerated 2,868 anglers. Mean weekday and weekend counts were 19.6 and 64.3, respectively. Projected fishermen counts estimate 8,318 man-days of effort. Anglers fished an average of 4.3 hours on weekdays and 5.4 hours on weekend days. The estimated harvest was 10,700 red salmon with 18.3 percent of the catch being sampled. Both catch and effort were the greatest recorded for the Russian River (Table 1).

TABLE 1 - The Red Salmon Sport Harvest and Effort on the Russian River, 1962-65.

<u>Year</u>	<u>Harvest</u>	<u>Effort (man-days)</u>	<u>Catch/hour</u>	<u>Period of Census</u>
1962	4,700	6,595	0.22	6/15 to 8/21
1963	5,062	7,882	0.19	6/8 to 8/15
1964	6,855	4,942*	0.31	6/20 to 8/20
1965	10,700	8,318	0.25	6/16 to 8/15

\*Damage to the Seward Highway by the March 27 earthquake resulted in reduced effort.

A counting tower at the outlet of Lower Russian Lake permits an assessment of the escapement after it has passed both the Cook Inlet commercial and Russian River sport fisheries. The sport harvest, based on a tower estimate of 37,152 red salmon, constituted 22.4 percent of the total run in the Russian River. Table 2 shows past the tower estimates and percentages taken by the sport fishery.

TABLE 2 - Russian River Red Salmon Tower Counts and Percentages taken by the Sport Fishery, 1962-65.

Year	Tower Count	Count Period	Percentage Taken by Sport Fishery
1962	48,214	6/18 to 8/31	8.9
1963	65,960	6/18 to 8/23	8.2
1964	52,052	6/20 to 8/15	11.6
1965	37,152	6/20 to 8/15	22.4

Snagging, despite the regulation prohibiting the use of treble hooks, accounted for 52 percent of the effort. Thirty percent of the anglers employed conventional techniques, and 18 percent used a combination of both methods. Streamer flies accounted for nearly all the fish hooked voluntarily in the mouth. Catch-per-hour data reveals that snag and fly fishermen had a similar rate of success, and anglers using a combination of both methods enjoyed the greatest catch per hour (Table 3). The seasonal rate of success for the combined fishing methods was 0.25 fish per hour.

TABLE 3 - Catch per Unit of Effort by Angling Method for Russian River Red Salmon, 1965.

Fishing Method	Percentage of Effort	Catch/hour	Average hours Fished
Snagging	52.0	0.25	5.1
Conventional (flies)	30.0	0.24	4.5
Combination*	18.0	0.30	5.9

\*Includes the use of both flies and snagging during a single angling trip.

### Grayling Transplants

Arctic grayling, which are not endemic to the Kenai Peninsula, were introduced into Crescent Lake in 1952. Because this plant was very successful, and to add to the variety of the sport catch, several attempts have been made to transplant Crescent Lake stock to other Peninsula waters.

With assistance from the U.S. Forest Service and the U.S. Fish and Wildlife Service, five experimental grayling transplants were made during 1965. All waters selected for introductions have suitable spawning areas for self-sustaining populations and, with the exception of Upper Granite Creek, lie within the Kenai River drainage.

A total of 1,029 grayling was seined at the outlet of Crescent Lake from August 3 to 5. Holding and transfer mortality amounted to 41 fish. Table 4 shows the number of fish and the lakes where the introductions were made.

TABLE 4 - Waters Stocked with Grayling During 1965.

<u>Name</u>	<u>Surface Acres</u>	<u>Number of fish</u>
Twin Lakes	260	176
Vagt Lake*	41	170
Grayling Lake**	28	151
Devils Pass Lake	30	113
Upper Granite Creek	---	378

\*Stocked with 49 grayling in 1963.

\*\*Stocked with 154 grayling in 1964.

Fork lengths from 152 grayling ranged from 105 to 374 mm with a mean of 227.9 mm. Based on Scale readings from 42 fish, the transplant was composed of 76 percent age-II+, 15 percent age-I+, and 9 percent age-III+.

#### Lake Surveys

Expansion of the recreational fisheries of the northwestern portion of the Kenai Peninsula is largely dependent on the development of roads and other access facilities. In 1964, to increase outdoor opportunity in this remote area, the U.S. Fish and Wildlife Service established the Swan Lake Canoe System. The system's land and stream portages provide access to 28 lakes that previously were accessible only to anglers who could afford charter aircraft. Good initial utilization of the system prompted a cooperative investigation by the U.S. Fish and Wildlife Service and Alaska Department of Fish and Game to determine the feasibility of incorporating additional waters into a canoe system.

Surveys were confined to lakes located on the Kenai National Moose Range with major effort directed toward waters within the Swanson River watershed. The 52 surveyed lakes ranged in size from 5 to 430 acres and in maximum depth from 14 to 105 feet. Table 5 shows the location, size and maximum observed depth of these waters. Population sampling revealed game fish in 41 lakes with rainbow trout and Arctic char the most common species (Table 6). Silver salmon, Oncorhynchus kisutch, and longnose suckers, Catostomus catostomus, were also present in several waters. The area best suited for a canoe system is depicted in Figure 1.

Gill net catches from 63 lakes in the Swanson River drainage were analyzed to determine major population features for rainbow trout and Arctic char. Fish were collected from June to October during 1962 through 1965. All data were treated as a group because of the geographical proximity of the lakes and the similarity of their fish faunas. The lakes do differ in physical characteristics but most are dystrophic and fairly shallow. Threespine sticklebacks, Gasterosteus aculeatus, are abundant in all lakes.

Figure 2 illustrates a trimodal length distribution for a sample of 851 rainbow trout. Modal values are probably appreciably reduced, however, because of the different collection dates and the number of waters involved. Sexes were almost equally represented in the sample (52.2 percent males). Males were more numerous in the length interval below 300 mm while females were slightly more abundant in the larger size group. Mean fork lengths for males and females were 276.2 and 287.3 mm, respectively.

TABLE 5 - Location, Surface Acreage and Maximum Depth of Lakes Surveyed During 1965.

Name of Lake	Surface Acres*	Maximum Observed Depth (ft.)	Location
Woods	48	26	T9N., R7W., Sec. 34-35
Mouse	9	20	T8N., R7W., Sec. 18-19
Rodent	18	16	T8N., R7W., Sec. 19-20
Hat	28	18	T8N., R7W., Sec. 18-19
Lo	20	30	T8N., R7W., Sec. 18-17
Lonely	53	47	T8N., R7W., Sec. 8-17
Kuvial	70	52	T8N., R7W., Sec. 8-9
Paddle	105	40	T8N., R7W., Sec. 21-28
Yugok	30	35	T8N., R7W., Sec. 28
Channel	98	50+	T8N., R7W., Sec. 22
Lure	43	37	T8N., R7W., Sec. 16
Pot	10	20	T8N., R7 ., Sec. 16
Pond	23	30	T8N., R7W., Sec. 17
Lost	48	65	T8N., R7W., Sec. $\frac{4-3}{9}$
Chum	8	23	T8N., R7W., Sec. 16-21
Odd	5	25	T8N., R7W., Sec. 27
Drake	165	105	T7N., R8W., Sec. $\frac{17-18}{7}$
Arctic Loon	30	23	T7N., R8W., Sec. 10
Alva	38	40	T7N., R8W., Sec. 10-11
Waterfowl	77	46	T7N., R8W., Sec. $\frac{4-5}{8-9}$
Spinner	13	28	T7N., R8W., Sec. 17
Wyrob	27	60	T7N., R8W., Sec. 17
Lemon	15	27	T7N., R8W., Sec. 17-18 19-20

\*Acreages were determined by map grids from U.S.G.S. maps (1:63,360).



TABLE 5 (Con't) - Location, Surface Acreage and Maximum depth of lakes surveyed During 1965.

Name of Lake	Surface Acres*	Maximum Observed Depth (ft.)	Location
Pad	8	16	T8N., R7W., Sec. 27
Falcon	238	56	T8N., R7W., Sec. <u>17-18</u> 7
Olsjold	48	29	T8N., R7W., Sec. 1
Eider	113	58	T9N., R7W., Sec. 36
Pepper	430	42	T9N., R7W., Sec. <u>24-25</u> 36
Campers	103	23	T8N., R7W., Sec. 5
Gene	310	36	T9N., R7W., Sec. <u>26-27</u> 35-36
Swanson	320	41	T9N., R7W., Sec. 16
Dog	23	57	T8N., R7W., Sec. 16
Polske	15	35	T7N., R8W., Sec. 19
Skookum	45	60	T7N., R8W., Sec. 18
Sabaka	75	58	T7N., R8W., Sec. 6-7
Silver	153	40	T6N., R9W., Sec. 1-2
Breeze	23	30	T7N., R9W., Sec. 14
Anerta	33	26	T7N., R9W., Sec. 12
Pan	10	17	T8N., R7W., Sec. 19
Ballon	10	21	T8N., R7W., Sec. 17
Gourd	10	24	T8N., R7W., Sec. 17
Antler	123	53	T8N., R6W., Sec. 19-30
Wonder	92	24	T9N., R6W., Sec. 31
Snowshoe	190	84	T8N., R6W., Sec. <u>19-20</u> 17
Otolith	7	20	T8N., R7W., Sec. 27
Kalun	46	26	T8N., R7W., Sec. 17-20
Redpoll	30	26	T8N., R7W., Sec. 8
Berry	53	19	T8N., R7W., Sec. <u>5-6</u> 8
Leaf	65	23	T8N., R7W., Sec. 7-8
Lilli	62	28	T7N., R9W., Sec. 35
West Lilli	13	14	T7N., R9W., Sec. 34-35
Alum	18	65	T7N., R8W., Sec. 17

\*Acreages were determined by map grids from U.S.G.S. maps (1:63,360).

TABLE 6 - Test Net Results for Lakes Surveyed During 1965.

<u>Name of Lake</u>	<u>Species**</u>	<u>Number of Fish</u>	<u>Fork Length (mm)</u>	<u>Mean (mm)</u>	<u>Catch per * Hour</u>
Woods	Char	11	269-524	369	0.24
	RB	5	314-380	344	0.11
	SS	2	216-217	216	0.04
Mouse	RB	12	177-390	274	0.59
	SS	1		182	0.05
	SK	8	264-414	344	0.40
Rodent	RB	10	233-478	362	0.43
	SK	5	160-260	215	0.22
Hat	RB	17	164-406	276	0.85
	SK	8	386-510	425	0.40
Lo	RB	10	190-434	275	0.49
	SK	7	218-284	258	0.35
Lonely	Char	25	204-370	289	0.52
	RB	3	202-297	244	0.07
Kuviak	Char	9	195-357	272	0.21
	RB	4	332-459	380	0.09
	SS	1		212	0.02
Alva	RB	7	158-390	227	0.10
Yugok	RB	2	550-634	592	0.04
	SK	6			0.13
Channel	RB	22	199-361	279	0.48
	Char	21	287-354	315	0.45

TABLE 6 (Con't) - Test Net Results for Lakes Surveyed During 1965.

<u>Name of Lake</u>	<u>Species**</u>	<u>Number of Fish</u>	<u>Fork Length (mm)</u>	<u>Mean (mm)</u>	<u>Catch per* Hour</u>
Lure	Char	12	230-414	323	0.49
	RB	2	325-395	360	0.08
	SK	1			0.05
Pot	Char	5	321-409	229	0.21
	RB	4	194-261	382	0.17
	SK	6			0.25
Pond	Char	4	206-442	344	0.17
	RB	1		315	
	SK	4		---	0.17
Lost	Char	7	218-392	305	0.14
Chum	RB	4	262-282	274	0.17
	SK	2	420-485	452	0.08
Odd	RB	3	266-537	383	0.13
	SS	1		157	0.04
Paddle	Char	55	196-401	307	0.42
	RB	35	155-335	249	0.27
	SK	5	428-450	438	0.04
	SS	1		181	0.01
Drake	RB	24	175-328	224	0.37
	Char	1		305	0.02
Arctic Loon	RB	9	209-505	377	0.09
	SS	9	130-260	181	0.09

TABLE 6 (Con't) - Test Net Results for Lakes Surveyed During 1965.

<u>Name of Lake</u>	<u>Species**</u>	<u>Number of Fish</u>	<u>Fork Length (mm)</u>	<u>Mean (mm)</u>	<u>Catch per* Hour</u>
Waterfowl	SS	17	149-180	164	0.26
	Char	15	270-470	368	0.23
	RB	6	200-344	270	0.10
Spinner	RB	30	174-335	237	1.25
Wyrob	RB	19	163-374	283	0.41
	Char	1		405	0.02
Lemon	RB	1		428	0.04
Pad	SS	8	173-251	212	0.38
Falcon	Char	29	206-400	301	0.32
Olsjold	Char	6	262-468	433	0.23
Eider	Char	19	249-370	301	0.38
	SK	7	245-540	398	0.14
Pepper	RB	32	136-407	271	0.47
	SS	3	168-200	184	0.04
	SK	19	160-450	343	0.28
Campers	RB	23	216-483	351	0.29
Gene	RB	32	172-361	270	0.50
	Char	3	355-436	398	0.05
	SS	2	183-205	194	0.03
	SK	26	173-442	329	0.41

TABLE 6 (Con't) - Test Net Results for Lakes Surveyed During 1965.

<u>Name of Lake</u>	<u>Species**</u>	<u>Number of Fish</u>	<u>Fork Length (mm)</u>	<u>Mean (mm)</u>	<u>Catch per* Hour</u>
Swanson	Char	9	340-510	449	0.16
	RB	8	178-348	220	0.14
	SK	18	166-458	312	0.33
Dog	Char	7	290-448	343	0.31
	RB	2	235-450	342	0.08
Polske	RB	2	327-367	347	0.09
Breeze	RB	13	276-420	344	0.27
Sabaka	Char	14	215-385	330	0.20
Skookum	RB	46	156-393	252	0.47
	Char	24	190-412	312	0.25
Silver	RB	34	180-465	305	0.46
	SS	6	142-170	156	0.08
	Char	1		200	0.01
	C				
Anerta	Char	24	282-445	342	0.46
	RB	15	164-379	238	0.29
Pan	Not sampled - same species as Rodent and Hat Lakes			(Rainbow)	
Ballon	Not sampled - same species as Lonley Lake			(Rainbow & Char)	
Gourd	Not sampled - same species as Pot and Pond Lakes			(Rainbow & Char)	
Antler	No fish taken				
Wonder	No fish taken				

TABLE 6 (Con't) - Test Net Results for Lakes Surveyed During 1965.

<u>Name of Lake</u>	<u>Species**</u>	<u>Number of Fish</u>	<u>Fork Length (mm)</u>	<u>Mean (mm)</u>	<u>Catch per* Hour</u>
Snoeshoe	No fish taken				
Otolith	No fish taken				
Kalun	No fish taken				
Redpoll	No fish taken				
Berry	No fish taken				
Leaf	No fish taken				
Lilli	No fish taken				
West Lilli	No fish taken				
Alum	No fish taken				

\*Catch/net hour - 125-foot variable mesh.

\*\*Key:

RB - rainbow trout  
Char - Arctic char  
SS - silver salmon  
SK - longnose sucker

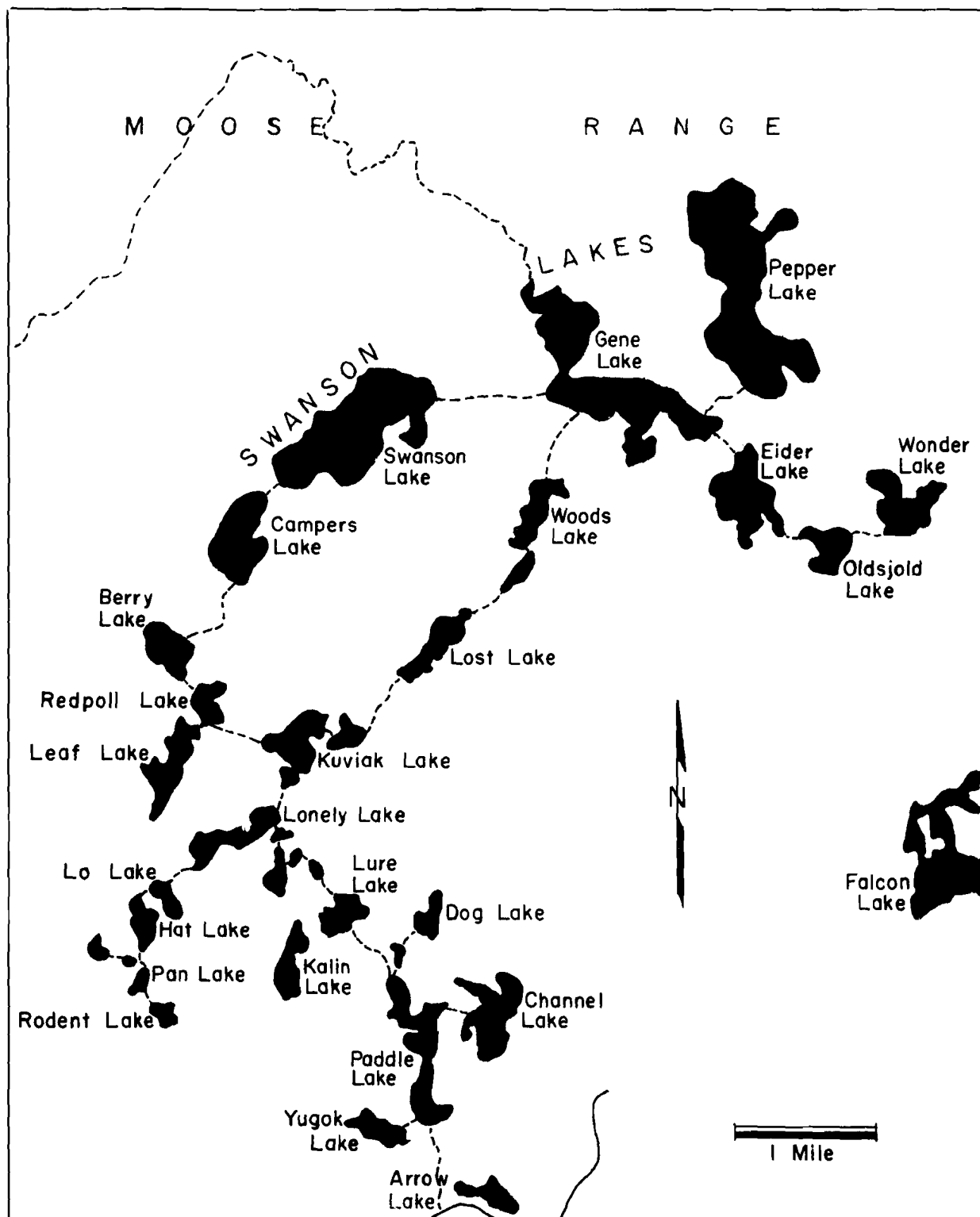


Figure 1. Proposed Swanson River canoe system (USGS, Kenai-D-2)

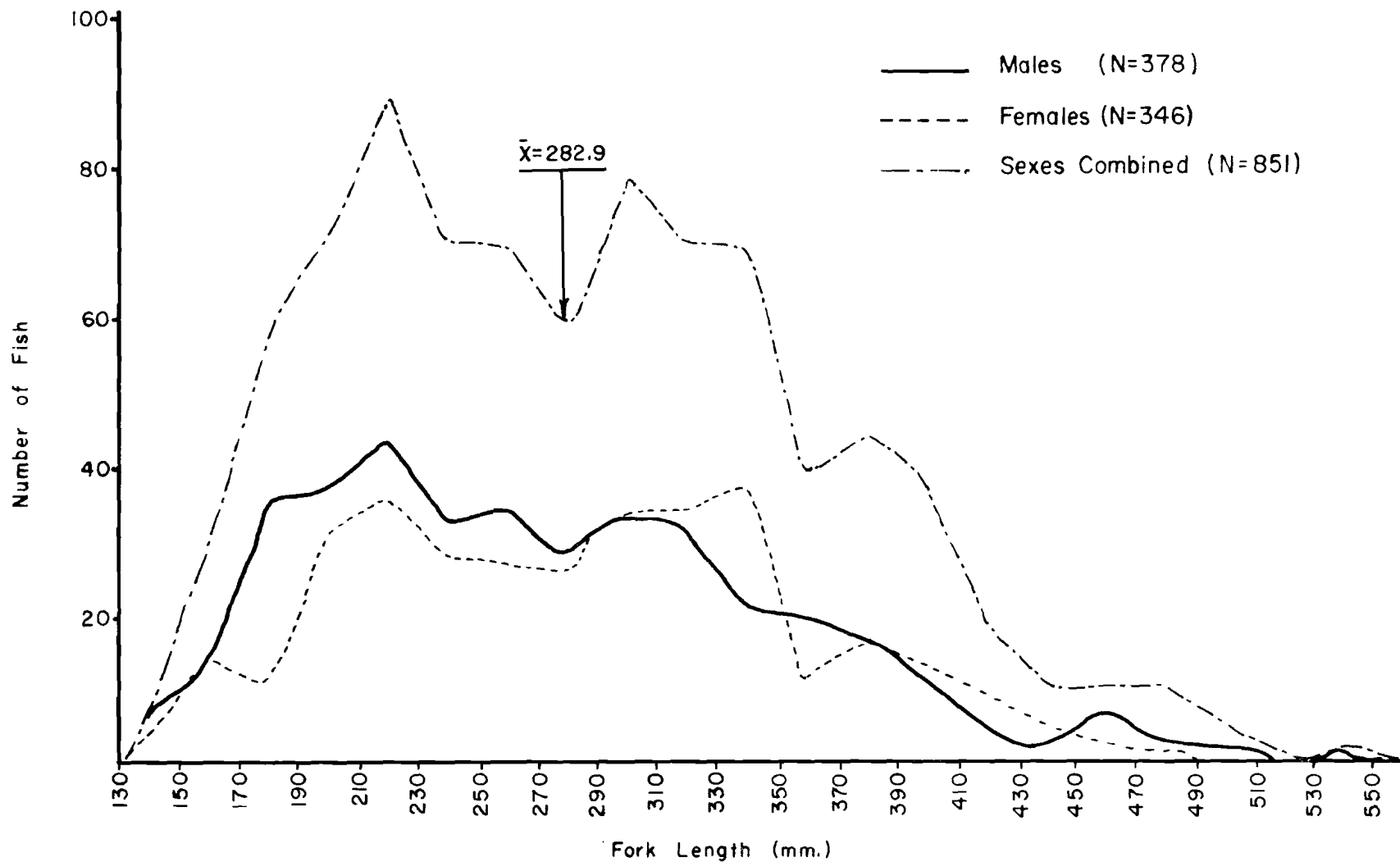


Figure 2. Length distribution of male and female rainbow trout by 20-mm. intervals collected in the Swanson River drainage, 1962-1965.



Scales were examined from 242 rainbow trout collected during early summer from the Swanson River drainage. Thirty-seven percent of the scales were not analyzed for the following reasons: regeneration, marginal erosion, bad mounts, and poorly defined annuli. The length distribution of aged fish indicates a considerable range in length for individual age groups and an extensive overlap between neighboring age groups (Table 7). Mean fork lengths for age-groups I through VII were 101, 184, 245, 298, 330, 385, and 375 mm, respectively. A large portion of the sample was made up of age-groups III, IV and V. The absence of age-I and the small number of age-II trout in the gill net catch probably resulted from gear selectivity or incomplete recruitment from tributary nursery areas. Males were dominant through age-group IV and females were most numerous in age-groups V through VII.

TABLE 7 - Length Distribution by Age Groups of Rainbow Trout from the Swanson River Drainage, 1965.

Fork Length (mm)	Age Group						
	<u>I*</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>VI</u>	<u>VII</u>
70- 89	3	--	--	--	--	--	--
90-109	23	--	--	--	--	--	--
110-129	5	1	--	--	--	--	--
130-149	--	6	--	--	--	--	--
150-169	--	2	--	--	--	--	--
170-189	--	16	1	--	--	--	--
190-209	--	5	3	--	--	--	--
210-229	--	5	17	--	--	--	--
230-249	--	--	19	1	--	--	--
250-269	--	--	13	5	--	--	--
270-289	--	--	2	7	2	--	--
290-309	--	--	1	5	6	--	--
310-329	--	--	--	7	8	1	--
330-349	--	1	--	2	9	1	1
350-369	--	--	1	2	1	1	--
370-389	--	--	--	--	3	2	1
390-409	--	--	--	--	1	3	--
410-429	--	--	--	--	--	1	1
430-449	--	--	--	--	--	--	--
450-469	--	--	--	--	--	1	--
Average Length	101	184	245	298	330	385	375
Percentage of Females	--	34.5	36.8	31.0	66.7	70.0	100.0

\*All age I and seven of the age II fish were collected from Canoe Creek with rotenone.

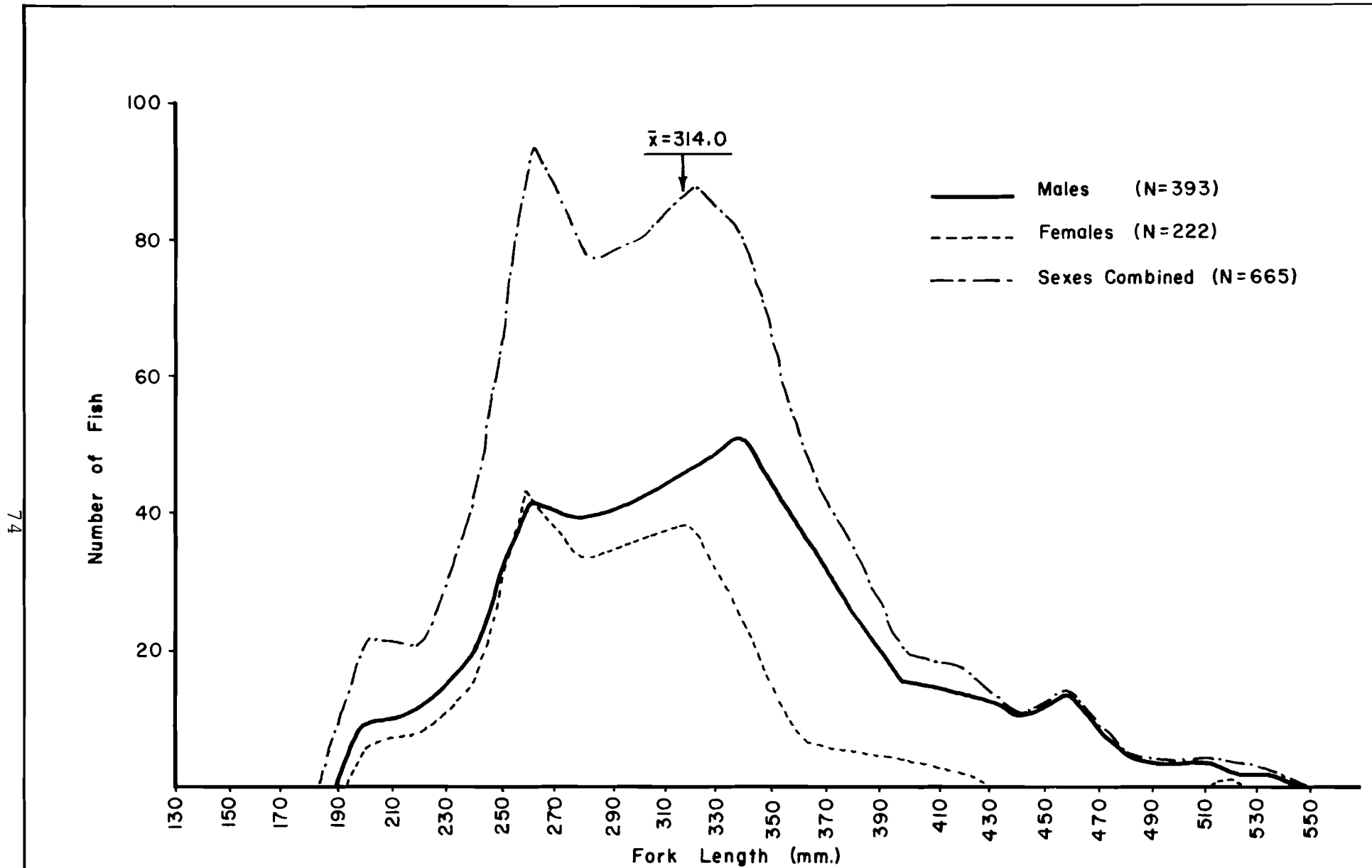


Figure 3. Length distribution of male and female Arctic Char by 20-mm. intervals collected in the Swanson River drainage, 1962-1965.

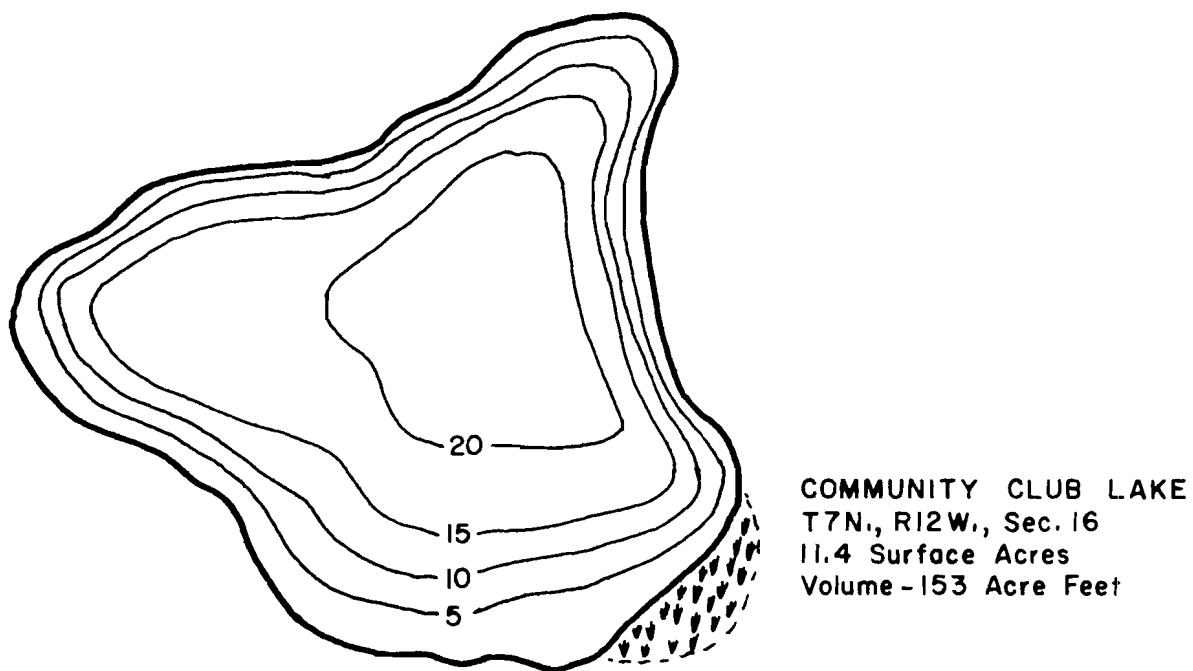
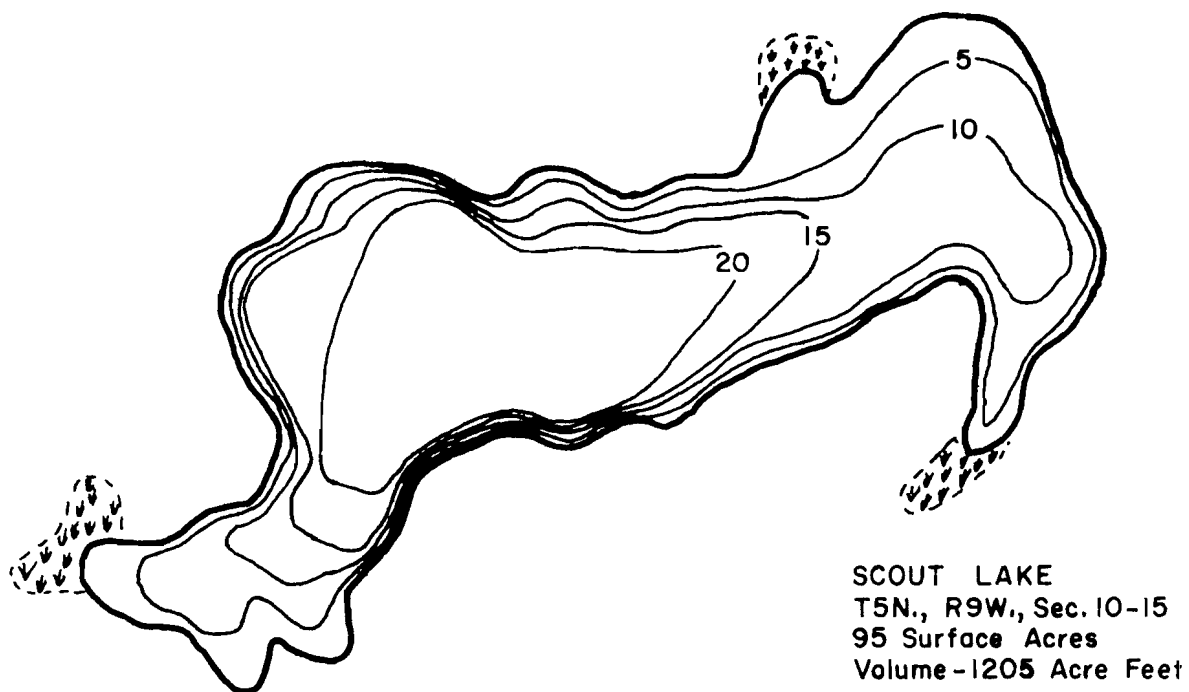


Figure 4. Hydrographic maps of Scout and Community Club Lakes.  
(Contour interval 5 feet.)

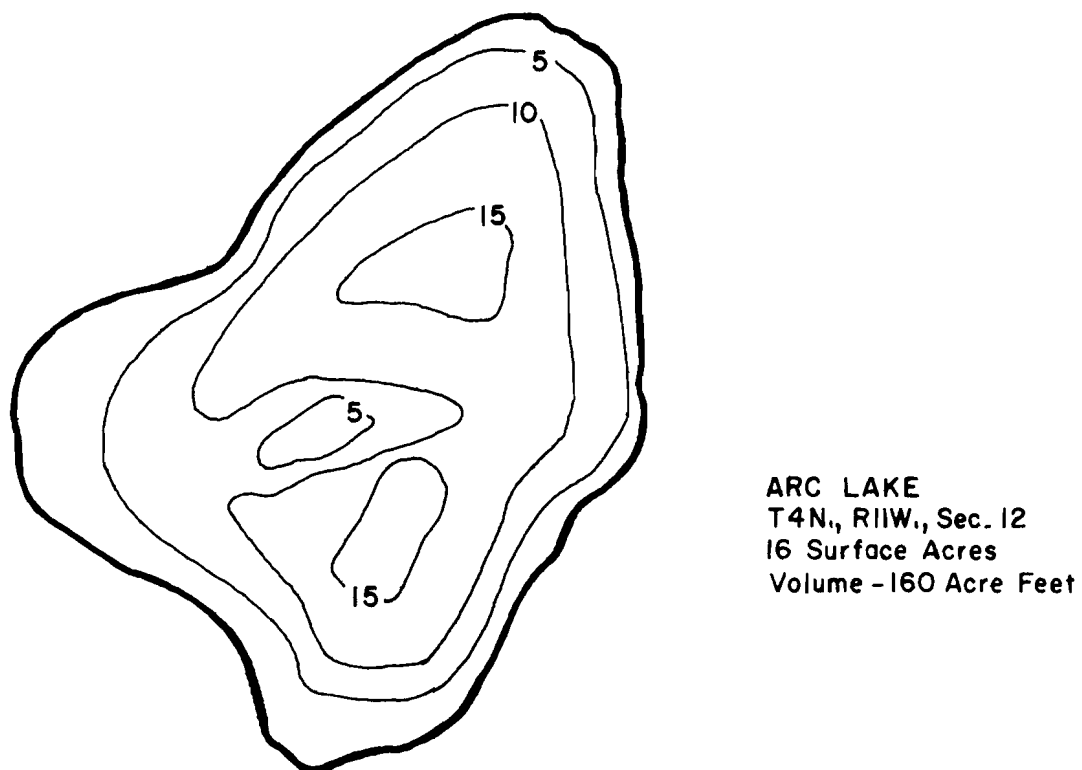
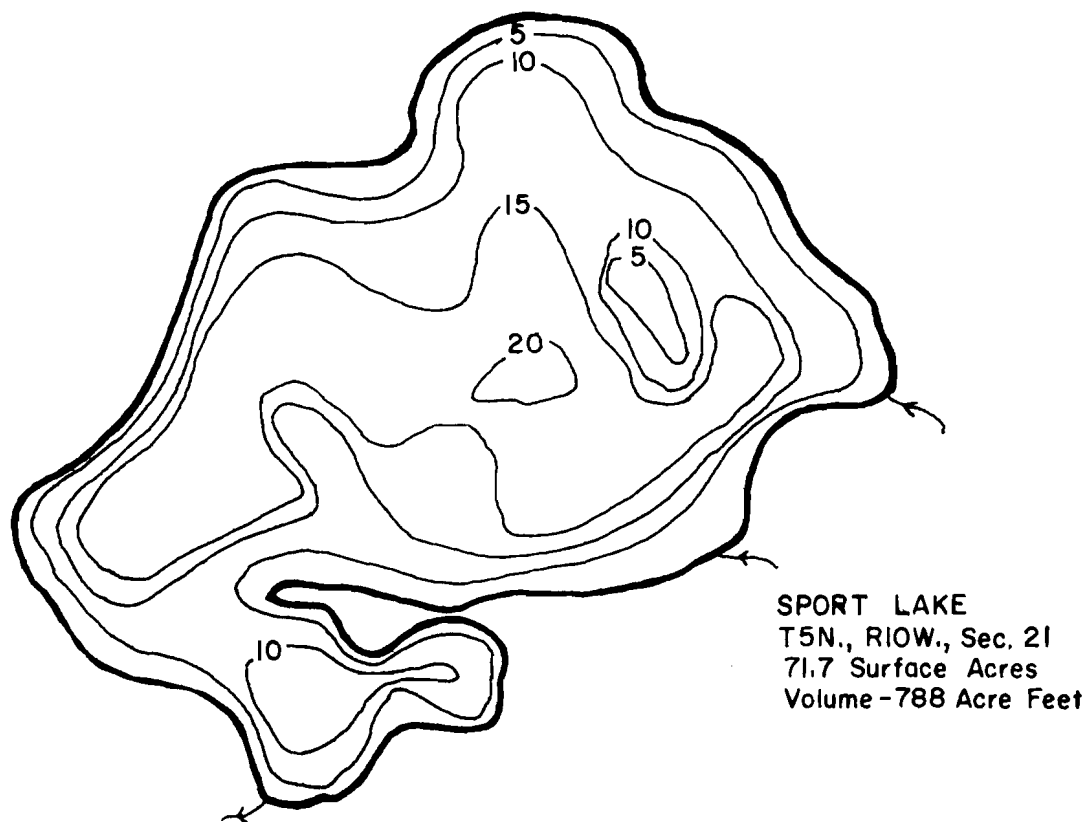


Figure 5. Hydrographic maps of Sport and Arc Lakes. (Contour interval 5 feet.)

The length composition of 665 gill-netted Arctic char differs considerably from that of rainbow trout (Figure 2 and 3). Char and trout less than 250 mm in fork length comprise 12.7 and 39.7 percent of their respective samples. This disparity probably was caused by selective sampling and is believed to represent a different habitat preference for the young of the two species. The catch data reflects only the relative abundance of small fish in shallow water because the nets were normally fished with the small mesh shoreward. A reversal of this procedure generally resulted in greater numbers of small char. The plankton feeding habits of small char also indicate that this segment of the population occupies open water areas.

Length differences between male and female char are shown in Figure 3. The average fork length of males (330.3 mm) was 36.8 mm greater than that of females (293.5 mm). Males comprised 81.0 percent of the sample over 330 mm in length. The absence of females from the larger size groups suggests slower growth for this sex or a higher mortality. Age data are not available to substantiate either possibility.

The sex composition of the entire sample was 63.9 percent male. This unbalanced ratio may present a biased picture because of the paucity of information concerning small fish. The sex ratio for gill-netted char less than 270 mm long was nearly equal.

#### Volumetric Surveys

Complete volumetric surveys were performed on four lakes considered suitable for management. Morphometric data for these lakes are presented in Figures 4 and 5. Sport and Arc Lakes were rehabilitated with 1.0 ppm rotenone at a 5 percent level. Both lakes will be stocked with rainbow trout during the spring of 1966.

Complete records of all cataloging and inventory activities during this report segment are on file at the Seward and Soldotna offices of the Alaska Department of Fish and Game.

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